

Status and Distribution of *Crocodylus intermedius* in Colombia
Summary of censuses 1994 - 1997

Miguel A. Rodríguez M

Introduction

The Orinoco caiman is confined to the hydrological area of the Orinoco River, which in Colombia is constituted by 8 basins with a extension of 301.807 square kilometers (table 1)

Table1. Basins extension of the Orinoco - Colombia hydrological area

Hydrological Area	Basins	Extension (km ²)
ORINOCO	Arauca river	10.268,63
	Casanare river	18.388,49
	Meta river	64.019,25
	Orinoco river	30.917,70
	Guaviare river	78.434,95
	Vichada river	28.290,90
	Inírida river	49.937,94
	Tomo river	21.549,50
TOTAL		301.807.40

Accordingly to Medem (1980), *Crocodylus intermedius* was very abundant before middle of '30 decade, in the rivers Arauca, Casanare and Meta, and less abundant in the basins of the rivers Vichada, Guayabero and Guaviare; the species was not reported in the Inírida basin, so it is calculated that the occupation area embraces 251.869 km². The Duda River, tributary of the Guayabero River, constitutes the western limit of the distribution area.

Reports from Humboldt, Gumilla and Medem (in Medem, 1980) registered the presence of the Orinoco caiman in the rivers Ariari (Guaviare), Guejar (Guaviare), Cuminía, (Guaviare), Meta, Guachiría (Meta), high Ariporo (Casanare), low Guaviare, Caño Cabuyare (Arauca), Orocué (Casanare), San José (Guaviare), Cravo Norte (Arauca), Capanaparo, high and low Tuparro (Vichada), Caño Matepalma (Arauca), high Casanare, and in the Plana river (Meta).

The study of Medem (1980) indicates that during the period in which the commercial hunt of the Orinoco caiman prevailed in Colombia (1930 to 1960), at minimum were harvested between 235.000 and 254.000 caimans into the whole distribution area.

Censuses, monitoring and population evaluations

Two studies of natural populations of *Crocodylus intermedius* have been carried out in Colombia. During 1974 and 1975, professor Federico Medem performed the first population study. Different investigators between 1994 at 1997 advanced the second study (Rodríguez, 2000), supplemented with monitoring activities developed in the rivers Ele and Cravo North during the year 2000.

A size evaluation of the natural population of *C. intermedius* were carried out between 1974 and 1975, with a count 280 mature specimens, and the total population was estimated in 780 individuals (Table 2).

Table 2. Distribution of specimens of *Crocodylus intermedius* sighted during the population evaluation carried out between 1974 and 1975. (Medem, 1980).

<i>Department</i>	<i>observed Individuals</i>
Arauca	180
Casanare	49
Meta	14
Vichada	37
Total	280

During the project "Status, Distribution and Systematic of the Colombian Crocodile - Censuses of 1994, 1996 and 1997", samplings were made in 21 points of 8 sub-basins in the hydrographic area of the Orinoco, which are presented in table 3.

Table 3. Listing of sampling places during the evaluation of Crocodile population in Colombia during the Censuses 1994-1997 in the Hydrographic Area of the Orinoco.

<i>Cuenca</i>	<i>Subcuenca</i>	Sampling Places
Casanare river	Cravo Norte river	River: Ele, Cravo Norte, Lipa. Madreviejas: Naranjitos y Alcalá Laguna: El Descanso
	Casanare river	River: Casanare (Puerto Rondón) Caño: Matadepalma
Guaviare river	Guaviare river	River: Guaviare Lagunas: Guarura, El Cejal.
	Guayabero river	Macarena - Raudal Angostura
	Duda river	Puerto Agujo
Inírida river	Inírida river	Inírida river
Meta river	Negro ²	Laguna Mozambique
Orinoco river	Tuparro	River: Tuparro, Orinoco
Tomo river	Direct Tomo from Vita to Mouth ³	River: Tomo Laguna: El Mirador y Guaipe

In the censuses carried out at the Ele and North Cravo rivers of the Casanare basin, 28 caimans were located in 35.4 kilometers (0.79 ind/km.). The distribution histogram in size classes for this group shows a notorious predominance of mature animals and the absence of juvenile (figure 1).

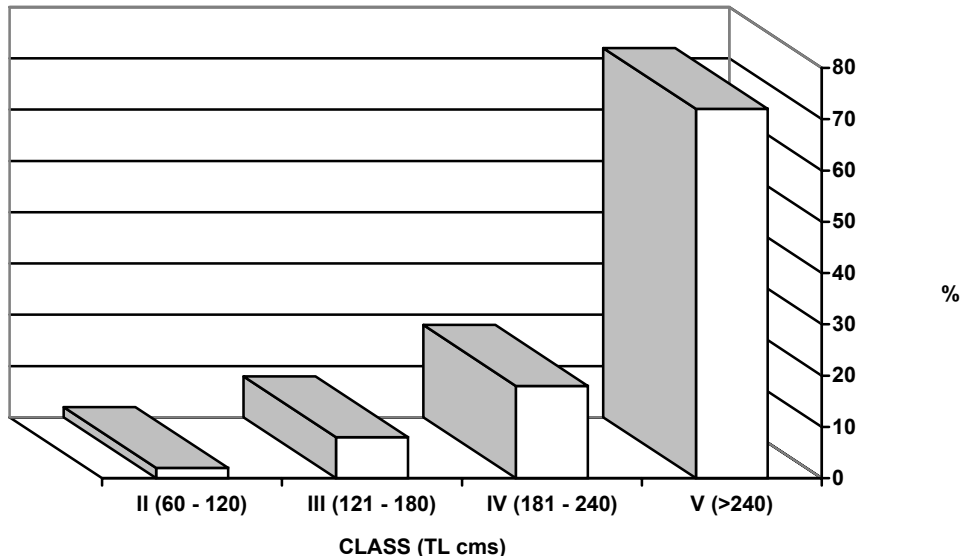


Figure 1 - Distribution in size classes of *Crocodylus intermedius* population in rivers Ele-Cravo North (Casanare basin), censuses of 1994-1995.

Although in the crocodiles populations subjected to hunt, usually the superior classes are improperly represented, it is evident that in the population of *C. intermedius* of the Ele River the hatchlings and juvenile has been extracted or the nests offspring has even been impeded.

Interviews to the inhabitants of the area indicate that during the dry season of 1995-1996, the reproductive process of this nucleus produced seven nests at least. From these, only one has natural offspring and other one artificially, while the remaining ones were used as food by the local residents.

Two mature specimens were observed in the Lipa River, and information was obtained about the presence of specimens in the Orinoco River, inside the National Park El Tuparro, and also in the place Garcitas, near to the park. One specimen was observed in the Casanare River at Fundo Santa María.

Observations were also made in the Duda River, near the town La Macarena and the rapids of Angostura, and in the Guayabero River near the camp of Puerto Agujo. Seven specimens were observed in the Guayabero River, in the tract that extends from the town of La Macarena to the school El Tapir. At least three of these were adults and one juvenile of one meter long, which indicate that recently in this area the caiman still reproduced. It was not possible to determine the size of the remaining three caimans, counted as "single eyes" in the inventory tables. The specimens found in a tract of 28.6 Km of the river has a density of 0.24 ind/km.

Residents of the sector informed the presence of caiman in 10 places along the area studied in the rivers Duda and Guayabero. Table 4 summarized the results of the study developed between 1994 and 1997.

Table 4. Number of specimens of *Crocodylus intermedius* observed during the censuses from 1994 to 1997 in the Colombian Orinoquia.

<i>Subcuenca</i>	Sampling Places	Observed Individuals
Cravo Norte river	Rivers: Ele, Cravo Norte	28
	Lipa River	2
	Madresviejas: Naranjitos y Alcalá	0
	Lagoon El Descanso	0
Casanare river	Casanare River (Puerto Rondón)	1
	Caño Matadepalma	0
Guaviare river	Guaviare River	0
	Lagoons: Guarura, El Cejal.	0
Guayabero river	Macarena - Angostura Rapids	7
Duda river	Puerto Agujo	0
Inírida river	Inírida River	0
Negro river	Lagoon Mozambique	0
Tuparro river	Rivers: Tuparro, Orinoco	2
Directs Tomo from Vita to mouth.	Tomo River	0
	Lagoons: El Mirador y Guaípe	0
TOTAL		40

The Station of Tropical Biology Roberto Franco of the National University of Colombia has advanced from 1990 the PROGRAM FOR THE CONSERVATION OF THE CAIMAN OF THE ORINOCO (Lugo and Clavijo, 1991), which also includes the evaluation of the status of natural populations.

Executing the first objective of the program, between 1994 and 1996 day and night censuses were carried out, as well as one airplane flight and an extensive program of interviews with the local residents. Totally, the researchers made day recognitions along 2553 Km and flew over 500 kilometers on the territory inhabited by caiman, interviewed 261 people and made night counts in 920 kilometers of different bodies of water (Lugo, 1998).

Table 5 summarize the results of the field work, from which Lugo (1998) estimates that in 70% of the distribution area of *C. intermedius* there were only 127 adult specimens, some of which reproduce successfully every year.

The report of the project indicates that at least four important relicts of *Crocodylus intermedius* exists: those already mentioned of the fluvial system of the rivers Ele, Cravo North, Lipa, and that of the rivers Duda and Guayabero, as well as a third in the half zone of the river Meta between La Primavera and La Culebra, where there would be near 15 adult specimen. Finally, a fourth group is located along the Vichada river, between the Muco river and La Raya, where is considered the presence of 15 adult dispersed specimens.

On the basis of the available information, can be assured that is not very probable to find other populations of *C. intermedius* or other relicts of these; probably few isolated and solitary specimen can be found.

Table 5. - Rivers, Towns, journeys in Km, sampling in Km, number of interviewed people, number of observed caiman, and number of estimated caiman.

Date	No. in Map	RÍVER, LOCATION	Km/Rc	Km/M	Intervie ws F. M.	No. censed	No. Estimated
Jan /94	1	PAUTO RIVER: Trinidad - El Banco (C)	120	20	10 2	-	1
Jan /94	2	META RIVER : Mouth of Pauto- Mouth of caño Yatea.(C)	60	10	2 1	-	2
Jan /94	3	GUACHIRIA RIVER: Mouth of Guachiría - La Macarena. (C)	50	25	4 1	-	2
Jan /94	4	Caño YATEA: Mouth - Lagunazo (C)	40	10	2	Tracks(a dult)	1 adult 1 juvenile
Feb /94	5	META RIVER: la Hermosa - La Voragíne - Marbella	80	35	3	1 juvenile 1 adult	2 adults 3 juveniles
Feb /94	6	Caño LA HERMOSA: Mouth El indio (C)	10	5	2 1	-	-
Feb/94	7	Caño PICOPICO: Mouth - El Recreo (C)	5	5	2	-	2 adults
Feb/94	8	Caño LA FORTALEZA: Mouth- Jazmines (C)	5	5	2	-	1 adult
Feb/94	9	ARIPORO RIVER: Paz de Ariporo- Mouths Caño El Carmen. San Vicente. (C)	3	2	6 2	-	1 adult
Dec /94	10	META RIVER: Mouth Caño Dumacita - Dumacita Lagoon.(C)	10	5	2	-	-
Jan /94	11	CUSIANA RIVER. Maní downstream	20	5	2	-	-
Dic/94	11	CUSIANA RIVER: Mouths Cusiana river - Santa Elena. (C)	60	35	5	-	2 adults and eggs
Jan /95	12	META RIVER: San Miguel - Mouths Cravo South. (C)	50	44	2 1	-	2 adults
Jan /95	13	CRAVO SOUTH RIVER: Mouths Cravo South - La Palmita. (C)	10	14	3	-	-
Jan /96	14	CASANARE RIVER: Mouths Ariporo River - Cravo North.	65	10	5 2	-	4 adults - Hatchlings
Jan /96	15	ARIPORO RIVER: Misión - Mouths of Ariporo river (C)	65	5	3 1	-	-
Jan /96	16	CASANARE RIVER: Mouths Casanare river -	25	5	4	3 adults	3 adults - Hatchlings

		Mouths Ariporo river - Cravo North.						
March /94	17	GUAYABERO RIVER: Macarena - El Charco(M)	85	40	13	5	-	10 adults - Hatchlings
March /94	18	Caño LOSADA: Mouths - Caño Perdido(M)	35	10	3		-	2 adults
March /94	19	DUDA RIVER: Mouths - Centro Japonés (M)	30	27	4	1	-	5 adults - Hatchlings
April/ 94	20	Caño SANTO DOMINGO: Mouths upstream. (M)	10	5	3		-	1 adult
Dec /95	21	MANACACIAS RIVER: Caño Minas- Mouths Melúa river.(M)	50	44	8		-	-
Jan /95	22	MUCU RIVER: La Palmita. (M)	40	30	2		-	-
Jun / 95	23	METICA RIVER : Pto López - San Carlos de Guaroa (M)	120	40	4	1	-	2 adults- 1 juvenile
Jun / 95	24	Caño PAJURE: Mouths - Chichimene. (M)	25	2	2		-	-
Jun / 95	25	ACACIAS RIVER: Manuelita – Sirimena (M)	6	5	4	1	-	-
Jun / 95	26	CAMOA RIVER: Mouths with Ariari river (M)	5	-	3		-	1 adult
Jun / 95	27	ARIARI RIVER: San Luis de Cubarral - El Diamante (M)	10	-	2		-	2 adults
July/ 95	28	MANACACIAS RIVER: Pto Gaitan - Mouths. (M)	5	-	2		-	-
Feb/95	29	ELE RIVER: La Ceiba - Mouths (A)	50	20	3		-	1 adult
Feb/95	30	CRAVO NORTH: Mouth Cuiloto – Mouths Ele river(A)	40	10	2	2	5 adults - 1 juvenile	10 adults - 4 juvenils - Hatchlings
Feb/95	31	CUILOTO RIVER: Mouths - El Pereño	20	5	2	1	5 adults - 35 hatchlings	10 adults - eggs and hatchlings
Feb/95	32	ELE RIVER: Mouths of Lipa - Mouths of Ele	30	20	3		5 adults	10 adults - eggs
Feb/95	33	LIPA RIVER: Mouths - Villa Tranca.	30	5	3		4 adults	8 adults - eggs and hatchlings
Feb/95	34	CRAVO NORTH RIVER: Palo Herrado-La Pampas(A)	60	30	4	2	3	5 adults - 2 juveniles - eggs
Feb/95	35	CASANARE RIVER: Puerto Rondón - El Delirio. El Vergel (A)	80	50	6	2	2 adults - 32 eggs	3 adults - eggs and hatchlings
Feb/95	36	Caño MATEPALMA: Hda.	5	2	4		-	1 adult

		Altamira (A)						
Jan /96	37	RIO CRAVO NORTE:- Bocas – Finca Bejuquero (A)	35	10	6	3	2 juveniles	2 adults juveniles - hatchlings
Jan /96	38	CASANARE RIVER: Cravo North- La Orquídea (A)	30	5	4	1	-	1 adult
Jan /96	39	TOMO RIVER: El Tapón- Mouths Tomo (V)	200	25	4		-	-
Feb /96	40	TOMO RIVER: San Luis del Tomo (V)	5	2	4		-	1 adult
Jan /95	41	TOMO RIVER: El Tapón - Caño Gavilán	2	-	3		-	2 adults
Feb /95	42	VICHADA RIVER: Cumaribo ~ La Raya	50	35	4	1	4 crías	3 adults - eggs - hatchlings
Jan /95	43	VICHADA RIVER: San José de Ocné - Mouths of Guarrojo. (V)	70	42	8		-	5 adults - eggs - hatchlings
March /95	44	GUAVIARE RIVER: Mouths of Inírida river - Anamaven (V)	30	10	1		-	-
March /95	45	ORINOCO RIVER: Anamaven – Castillitos (V)	20	5	3		-	3 adults
Dec /95	46	META RIVER: La Primavera- Laguna (V)	2	2	2	1	-	1 adult
Jan /96	47	META RIVER: Agua Verde - San Jorge (V)	40	5	6	4	-	2 adults 1 juvenile
Feb/94	48	ORINOCO RIVER: Puerto Carreño Casuarito.(V)	70	25	3		-	2 adults - hatchlings
Feb/94	49	META RIVER: Pto.Carreño- La Venturosa. – Mi Lucha (V)	250	139	10	2	1 adult	4 adults juveniles
March /95	51	INIRIDA RIVER: Puerto Inírida- Chorrobocon .(Gu)	120	10	10		-	-
July /95	52	GUAVIARE RIVER: San José del Guaviare- Siare (G)	200	40	12	4	-	2 adults
July /95	53	Caño Nare: Bocas - Escuela (G)	20	15	2	1	-	-
Feb/95	54	VICHADA RIVER- Cumaribo - Pto. Nariño						5 adults - hatchlings
		Totals	2558	920	218	43	30 adults 4 juveniles	127 adults

No. = Number of the track in map.

Km / Rc. = Kilometers traveled by water.

Km / M. = Kilometers sampled by night.

interview = Number of interviewed people H = Male F = Female

No. censused = Number of sighted caiman

No. Est. = Estimated number of caiman.

The letters among parenthesis indicate the departments that each place belongs:

To = Arauca; C = Casanare; G = Guaviare; GU = Guainía; M = it Puts; V = Vichada.

(Published with authorization of Lugo, M. 1998).

Conclusions

When applying the IUCN approaches on the population status, the conclusion is that *Crocodylus intermedius* in Colombia is in critical danger of extinction (CR). A population reduction has been observed in more of 80% in the last 10 years. The adult population does not possess more than 250 specimens, which are severely broken into fragments and with less than 50 adults in each one of the fragments.

Under the previous conditions, the recovery of the natural populations of the Orinoco Caiman will be almost impossible without an integral management plan for the species. This plan need to be based on the management of the nuclei of the rivers Ele and Duda, together with the reintroduction of specimens obtained by reproduction of the animals maintained in the Station Roberto Franco of the National University.

Law protected *Crocodylus intermedius*, which decree the total prohibition of the hunt since 1968. In 1997, the Ministry of the Environment declared the species in extinction danger and ordered the structuring and implementation of a national plan for its recovery and conservation, which was projected by the Colombia National University and Alexander Von Humboldt Institute.

Bibliography

BARAHONA, S. & MARTINEZ, A. 1997. Estado, Distribución, sistemática y Conservación de los Crocodylia Colombianos III. Con énfasis en el caimán del Magdalena (*Crocodylus acutus*) en los ríos Sinú, Man, Mira y Patía. Censo 1997. Ministerio del Medio Ambiente. Dirección General Forestal y de Vida Silvestre. Subdirección de Fauna. Instituto de Investigación de Recursos Biológicos "Alexander Von Humboldt". Santafé de Bogotá. (Mecangraf).

BARAHONA, S., BONILLA, P., MARTINEZ, A., NARANJO, H & RODRIGUEZ M, M.A. 1996. Estado, Distribución, sistemática y Conservación de los Crocodylia Colombianos I. Censo 1994 – 1995. Ministerio del Medio Ambiente. Dirección General Forestal y de Vida Silvestre. Subdirección de Fauna. Santafé de Bogotá. (Mecangraf).

BARAHONA, S., BONILLA, P., MARTINEZ, A., NARANJO, H & RODRIGUEZ M, M.A. 1996. Estado, Distribución, sistemática y Conservación de los Crocodylia Colombianos II. Censo 1995 – 1996. Ministerio del Medio Ambiente. Dirección General Forestal y de Vida Silvestre. Subdirección de Fauna. Santafé de Bogotá. (Mecangraf).

BARAHONA, S., BONILLA, P., MARTINEZ, A., NARANJO, H & RODRIGUEZ M, M.A. 1996. Estado, Distribución, sistemática y Conservación de los Crocodylia Colombianos. CENSO 1994 – 1996. Convención sobre el Comercio Internacional de Especies Amenazadas de Fauna y Flora Silvestres. CITES. Santafé de Bogotá. Colombia.

BONILLA, P Y BARAHONA, S. 1995. Censo poblacional de Caiman Llanero, *Crocodylus intermedius*, en un subareal de distribución en el Departamento del Arauca. Instituto Nacional de los Recursos Naturales Renovables y del Ambiente. Inderena, Bogotá. (Mecangraf).

LUGO R, M. 1988. Programa para la conservación del caimán del Orinoco (*Crocodylus intermedius*) en Colombia. Informe Final. Proyecto 290. Program Research Fellowship. NYZS The Wildlife Conservation Society. Proyecto 1101-13-205-92 de Colciencias. Universidad Nacional de Colombia. Facultad de Ciencias. Estación de Biología Tropical Roberto Franco. Villavicencio. (Citado con autorización del autor)

LUGO R, M. Y CLAVIJO, J. 1991. Programa para la conservación del caimán del Orinoco (*Crocodylus intermedius*) en Colombia. Estación de Biología Tropical Roberto Franco. Villavicencio.

MEDEM, F. 1974. Project 748. Orinoco Crocodile Survey. World Wildlife Yearbook, 1973 -74.

MEDEM, F. 1976. Project 748. Orinoco Crocodile Status Survey. The Orinoco Crocodile; Arauca Area. World Wildlife Yearbook, 1975-76.

MEDEM, F. 1981. Los Crocodylia de Sur América. Los Crocodylia de Colombia. Vol.1. Colciencias, Bogotá. Colombia.

NARANJO, H. 1997. Evaluación de las poblaciones de Crocodylia en la región Amazónica Colombiana. Censo 1997 Ministerio del Medio Ambiente. Instituto de Investigación de Recursos Biológicos "Alexander Von Humboldt". Santafé de Bogotá. (Mecangraf).

RODRÍGUEZ, M.A.(Editor) 2000. Estado y Distribución de los Crocodylia en Colombia. Compilación de resultados del Censo Nacional 1994 a 1997. Ministerio del Medio Ambiente – Instituto Alexander Von Humboldt. Bogotá.